

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Original) Genetically modified plants, characterized in that they include more than one copy of at least a sequence encoding a P_{1B}-type ATPase of the Zn²⁺/Co²⁺/Cd²⁺/Pb²⁺ subclass and that they overexpress said P_{1B}-type ATPase.

2. (Original) Genetically modified plants according to claim 1, characterized in that said P_{1B}-type ATPase is selected from the group consisting of heavy metal ATPase HMA1, HMA2, HMA3 and HMA4 of *Arabidopsis thaliana*.

3. (Currently Amended) Genetically modified plants according to claim 1 ~~or claim 2~~, characterized in that said genetically modified plants include more than one copy of at least two different sequences encoding two different P_{1B}-type ATPases of the Zn²⁺/Co²⁺/Cd²⁺/Pb²⁺ subclass.

4. (Currently Amended) Genetically modified plants according to claim 1 ~~or to claim 2~~, characterized in that they

include more than one copy of a sequence encoding a P_{1B} -type ATPase of the $Zn^{2+}/Co^{2+}/Cd^{2+}/Pb^{2+}$ subclass and at least another sequence selected among sequences encoding (1) an enzyme involved in metal chelation (phytochelatin synthase, glutathion synthetase or gamma-glutamylcystein synthase) or (2) another metal transporter such as YCF1 or other ABC transporters.

5. (Original) Recombinant vector able to transform plants, characterized in that said vector includes more than one copy of at least a sequence encoding a P_{1B} -type ATPase of the $Zn^{2+}/Co^{2+}/Cd^{2+}/Pb^{2+}$ subclass.

6. (Original) Recombinant vector according to claim 5, characterized in that said coding sequences are operably linked to and under the regulatory control of a plant-expressible transcription and translation regulatory sequence, such as a plant specific promoter.

7. (Currently Amended) Genetically modified plants, characterized in that they are transformed with a recombinant vector according to ~~claims 5 or 6~~ claim 5.

8. (Currently Amended) Plant cells characterized in that they are transformed with a recombinant vector according to ~~claims 5 or 6~~ claim 5.

9. (Currently Amended) Method of producing genetically modified plants according to ~~claims 1 to 4 or 7~~ claim 1 which overexpress at least a P_{1B} -type ATPase of the $Zn^{2+}/Co^{2+}/Cd^{2+}/Pb^{2+}$ subclass, said method comprising:

- preparing a recombinant vector according to claims 5 or 6, comprising more than one copy of at least a sequence encoding a P_{1B} -type ATPase of the $Zn^{2+}/Co^{2+}/Cd^{2+}/Pb^{2+}$ subclass, operably linked to and under the regulatory control of a plante-expressible transcription and translation regulatory sequence and

- introducing said recominant vector into a plant cell or plant tissue to produce a genetically modified plant cell or a genetically modified plant tissue.

10. (Currently Amended) Method of phytoremediation of heavy metals from soil, characterized in that it includes:

- a step of planting genetically modified plants according to ~~any one of claims 1 to 4 or 7~~ claim 1, in an area containing soil contaminated with at least one heavy metal and

- collecting and removing plant tissues from said genetically modified plants at appropriate time intervals.

11. (Original) Method of phytoremediation according to claim 10, characterized in that it involves the extraction of one of the following heavy metals: Zn, Co, Cd or Pb, from soil.

12. (Currently Amended) Method of phytoremediation according to claim 10 ~~or claim 11~~, characterized in that the entire plant might be removed after it is allowed to grow on metal-containing soil incorporating those metals into its tissues.

13. (Currently Amended) Method of phytoremediation according to claim 10 ~~or claim 11~~, characterized in that at appropriate time intervals, the metal containing tissues and more preferably leaves and possibly branches are removed from the plant, allowing the remaining plant tissues to survive.

14. (Original) Method of phytoremediation according to claim 13, characterized in that the collected plant tissues are removed from the growing area and properly disposed, so that the metal containing tissues are not allowed to reassimilate in the soil.

15. (Original) Method of phytoremediation according to claim 13, characterized in that said heavy metals may be extracted, in the M^{n+} state, from said plant tissues.

16. (Original) Method of phytoremediation according to claim 13, characterized in that said heavy metals are extracted from ashes obtained after having burnt the collected metal containing tissues, said metal being in the M^0 state.

17. (Currently Amended) Genetically modified plants, as defined in ~~any one of claims 1 to 4 and 7~~ claim 1, characterized in that said plants are selected in the group consisting of *Brassica juncea*, *Poplar*, *Nicotiana tabacum*.

18. (Currently Amended) ~~Use of genetically modified plants according to any one of claims 1 to 9, 15 or 16, for phytoextraction of~~ A method for phytoextracting Zn, Co, Cd or Pb, from a contaminated environment comprising planting a genetically modified plant according to claim 1.

19. (Currently Amended) ~~Use of genetically modified plants according to claim 7,~~ A method for phytoextraction of Co, Cd or Pb, from a contaminated environment comprising planting a genetically modified plant according to claim 7 in the contaminated environment.

20. (Currently Amended) Method of producing genetically modified plants according to ~~claims 1 to 9, 15 or 16~~ claim 1 which plants overexpress at least a P_{1B}-type ATPase of the Zn²⁺/Co²⁺/Cd²⁺/Pb²⁺ subclass, said method comprising:

- preparing at least one recombinant vector(s) according to ~~any of claims~~ claim 10 to 13, comprising one or more than one copy of at least a sequence encoding a P_{1B}-type ATPase of the Zn²⁺/Co²⁺/Cd²⁺/Pb²⁺ subclass, operably linked to and under the regulatory control of a plante-expressible transcription and translation regulatory sequence and

- introducing said at least one recombinant vector(s) into a plant cell or plant tissue to produce a genetically modified plant cell or a genetically modified plant tissue.

21. (Currently Amended) ~~Method~~ A method of phytoremediation of heavy metals from soil, ~~characterized in that it includes~~ comprising:

- ~~a step of~~ planting genetically modified plants according to ~~any one of claims 1 to 9, 15 or 16~~ claim 1, in an area containing soil contaminated with at least one heavy metal and

- collecting and removing plant tissues from said genetically modified plants at appropriate time intervals.

22. (Currently Amended) The method ~~Method~~ of phytoremediation according to claim 21, ~~characterized in that~~ ~~it~~ wherein the method involves the extraction of at least one of the following heavy metals: Zn, Co, Cd or Pb, from soil.

23. (Currently Amended) The method ~~Method~~ of phytoremediation according to claim 21 ~~or claim 22,~~ ~~characterized in that~~ wherein the entire plant is removed after it has been allowed to grow on metal-containing soil.

24. (Currently Amended) The method ~~Method~~ of phytoremediation according to claim 21 ~~or claim 22,~~ ~~characterized in that~~ wherein at appropriate time intervals, metal containing tissues are removed from the plant, said plant being left alive.

25. (Currently Amended) The method of claim 24, wherein leaves and ~~possibly~~ optionally branches are removed.

26. (Currently Amended) The method ~~Method~~ of phytoremediation according to claim 24 ~~or claim 25,~~ ~~characterized in that~~ wherein the collected plant tissues are removed from the growing area and properly disposed, so that

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the metal containing tissues are not allowed to reassimilate in the soil.

27. (Currently Amended) The method ~~Method~~ of phytoremediation according to claim 24 ~~or claim 25~~, ~~characterized in that~~ wherein said heavy metals ~~may be~~ are extracted, in the M^{n+} state, from said plant tissues.

28. (Currently Amended) The method ~~Method~~ of phytoremediation according to claim 24 ~~or claim 25~~, ~~characterized in that~~ wherein said heavy metals are extracted from ashes obtained after having burnt the collected metal containing tissues, said metal being in the M^0 state.